Order II. *PASSERIFORMES*
Family 1. *Passeres*
" 2. *Bucconidæ* (?)
" 3. *Trogonidæ*
" 4. *Meropidæ*
" 5. *Galbulidæ*
" 6. *Caprimulgidæ*
" 7. *Steatornithidæ*
" 8. *Coraciidæ*
Sub-fam. 1. Coraciinæ
" 1. Momotinæ
" 3. Todinæ (?)

Order III. *CYPSELIFORMES*
Family 1. *Macrochires*
Sub-fam. 1. Cypselinæ
" 2. Trochilinæ

The Homalogonatous birds must be divided upon a different basis, and their myological formulæ here come into service. Before going further it is necessary to show that the habits of the species are not the cause of their myological peculiarities in most cases, though probably in some they do affect them. The Heron and the Swallow have the same formula, and yet how different their habits? the same may be said of the Owls and the Swifts; the Kaleege and the Flamingo. The Auk and Guillemot, however, are most probably but distantly related to the Ducks and Penguins if the peculiarity in the nasal bones has the importance that I assign to it; nevertheless, the muscles of their legs agree more with them, than with the other Schizorhinal birds. By a glance at Table II., the manner in which the Homalogonati may be best subdivided according to the facts that I have been able to bring forward, may be obtained. Commencing with the orders, the *Galliformes* include all those birds related to the Fowls; and notwithstanding the high opinions to the contrary, I cannot feel justified in separating the Struthious birds away from this group. It is not difficult, after having seen the formula of the Musophagidæ and Cuculidæ (Table I.), to recognise that these families have nothing to do with the Anomalogonatous birds, although they are peculiar in the former having no cæca, and the latter a nude oil-gland. The Psittaci also cannot be placed anywhere else.

The *Anseriformes* all agree, with the exception of the Storm-Petrels, which are also otherwise difficult to place, in wanting the accessory semitendinosus (Y), and in having the great pectoral muscle very elongate. The whole family of petrels are exceptions in this point also, and may have to be put in the next order, amongst the Ciconiiformes.

The *Ciconiiformes* include amongst them the Accipitres, but myology is in no point more clear than with regard to the unnaturalness of that family as at present defined. Every Eagle, Hawk, true Vulture, and Owl, has for formula A. The Secretary Bird, which is generally placed with them, is represented by B X Y; from which it is seen to be as different from them as it can possibly be. This shows that the position of *Serpentarius* must be changed; that it is not a raptorial bird at all; and that, as in formula and general appearance it resembles *Cariama*, it must be placed near it and the Bustards. Similar arguments indicate that the Cathartidæ are not true Accipitrine birds, but must form an independent family, though still in the same order as the Falcons.

The *Charadriiformes* all possess the peculiar nasal arrangement which I have termed Schizorhinal. The *Turnicidæ* and *Parridæ* are included with the *Limicolæ*, and the *Pteroclidæ* with the *Columbæ*.

The justification of many of the smaller divisions of the above orders will be seen by comparing the myological formulæ, and by a review of the osteological, pterylographical, and visceral arrangement of each.

In any attempt at classification on new facts, it must be remembered that there must be great inequality in the importance of the results arrived at in each order as freshly defined. In one family there may be a uniformity in a particular structure which is greater than could possibly have been expected; whilst in another the previously constant character may be one of the most uncertain. For instance, the left carotid artery is alone present in all the Passerine birds that have ever been examined; but amongst the Bustards the Great Bustard has two, Denham's only the right, and *Tetrax* only the left. Therefore it is not to be wondered at that myology is equally uncertain in its indications sometimes, though on other occasions its teaching is most decided. In the above attempt at a new arrangement, it has been my endeavour to bring forward the results of observations made during a considerable time, with the facts obtained from previous work always kept prominently in the foreground.

NOTES

In a Congregation held at Oxford on Feb. 10, Prof. H. Smith introduced a statute providing that the certificate of the examiners appointed under the authority of the Delegates of the Examination of Schools, when given in Greek, Latin, and Elementary Mathematics, be accepted in lieu of Responsions. He represented that in Mathematics the standard would be higher than in Responsions; in Greek and Latin it would be equal, owing to the requirement of translation of "unseen pieces." The candidate would also have to pass in some other subject. It was therefore inconceivable that the idle should select the Schools Examination as the easier. The standard would be kept up by the employment of the same class of examiners as in other University examination. The preamble of the statute was accepted.

Dr H. Alleyne Nicholson, Professor of Natural History in University College, Toronto, has been appointed to the Professorship of Zoology in the Royal College of Science, Dublin, vacant by the resignation of Dr. Traquair. Prof. Nicholson is known as the author of many papers on the Graptolites, and as a writer of several text-books of zoology.

The Smith's Mathematical Prizes have been adjudged to Mr. Walter W. R. Ball, second wrangler, 1874, and Mr. George Stuart, B.A., Emmanuel College, Cambridge, bracketed fourth wrangler, 1874.

A meeting of those who have signified their interest in the formation of the new Physical Society will be held on the 14th inst., at 3 o'clock P.M., in the Physical Laboratory, South Kensington.

A general meeting of the Provisional Committee for the establishment of the Scientific Societies Club was held on Jan. 29 at the Westminster Palace Hotel, when an organising committee was appointed with a view to the early opening of the club. The number of "original members" is nearly complete, 231 gentlemen having given in their names. Among the Provisional Committee we notice the names of Dr. Gladstone, Prof. Lawson, and Prof. Morris, and others known to Science.

At the meeting of the Paris Academy of Sciences on Feb. 2 the place of Correspondent of the Astronomical Section, left vacant by the election of Sir George Airy to a Foreign Associateship, was filled up. M. Tisserand obtained 25 votes and M. Stéphan 23. The former was therefore elected. At the same meeting the Academy, sitting in secret committee, received the report of the committee appointed to select candidates for the Chair of Embryology at the College of France. M. Balbiani was placed first, M. Gerbe second. The election was announced for the 9th inst.

We have just received from Mr. Gerard Krefft the cast of a fossil specimen of extreme interest. It is that of one of the teeth of an extinct species of *Ceratodus* found with the usual *Diprotodon* remains in the alluvial deposits of the Darling Downs district of Queensland. This able naturalist has named the fish indicated by this fossil in honour of the present Colonial Secretary of Queensland, *Ceratodus palmeri*. It is larger than the corresponding tooth—the left upper dental plate—of *C. forsteri*, the enamel being rather coarser and the surface more undulated than that of Forster's fish. In the specimen under consideration, three of the prongs are perfect, being three-fourths of an inch in width. Mr. Krefft mentions that the existing fish is called "Jeevine," and not "Barramundi;" also that it never goes ashore, and is not caught, as supposed by some, with hooks baited with frogs.

The *Academy* has been favoured by Dr. Kirk with the following private telegram, which he received from Brigadier-General Schneider, C.B., Her Britannic Majesty's political Resident at Aden, with reference to the news of the death of Livingstone. Dr. Kirk considered that the details given in the telegram as published concerning Livingstone's death and the embalming of his body presented so many doubtful points which required clearing up, that he was anxious to ascertain whether Cameron had convinced himself of the accuracy of these reports by personal examination of the messengers who, it is said, preceded Livingstone's dead body to Unyanyembe, and among whom was Chumah, his servant; or whether the reports had come to his ear, before Chumah himself reached Unyanyembe, in the usual untrustworthy and exaggerated native manner. He therefore telegraphed to General Schneider; but, as will be seen by the reply from General Schneider, it cannot be ascertained at present whether Cameron actually saw Chumah. The evil tidings may have preceded him by some days; and there is nothing for it but to wait the receipt of Cameron's written advice:—"General Schneider to Dr. Kirk.—Aden February 2, 5.15 P.M.—Captain Prideaux merely says Chumah went ahead and gave intelligence to Cameron."

There has been instituted by the French Government, under the Minister of Public Instruction, a Commission of Scientific and Literary Voyages and Missions. The object of the Commission, we learn from *Les Mondes*, is (1) to discover what are the most useful scientific and literary enterprises; (2) to examine the projected voyages and missions proposed to the Minister; (3) to study the programmes of these missions, to give detailed instructions to those who undertake them, and to carry on correspondence, if necessary, during the voyage; (4) to examine, on their return, the works on which the voyagers have reported, and prepare their publication in a record of Missions, when that is founded; (5) to name to the Minister such voyagers as may be worthy of honourable reward after the completion of their enterprise; (6) to appeal to the various administrations to concentrate on certain enterprises all the resources at the disposal of the state. The Under-Secretary of State is President of the Commission, and M. Beulé Vice-President; while, among the members are, MM. Felix Ravaisson, Conservator of the Louvre Museum, Leon Renier, Chevreul, Milne-Edwards, D'Avezac, President of the French Geographical Society.

The *Paris Journal* gives a curious account of an hotel situated in the *Rue des Petites Ecuries*, which has a *clientèle* of living phenomena. It is an hotel of the lowest order, which was fitted up by a French barman for housing extraordinary creatures. The *homme chien* and his son Fedor lived there for some time. The giant of Folies Bergeres (8 ft.) dwelt there. He was an intimate friend of a dwarf whom he carried in his arms every evening, when taking his daily promenade after dark. There are also a good many acrobats and lion-tamers admitted into the house. Mdlle. Christine, the double sisters, were not a lodger; they had an agent of their own, an Englishman. Most of these curious specimens of humanity are placed under the direction of the hotel-keeper, who procures engagements for them at certain prices, according to their *demerits*, and directs them either to some of the minor theatres, concert-halls, or to the booths erected at suburban fairs. A *Table d'hote* of the Petites Ecuries Hotel, where all these strange creatures come together, is the most extraordinary sight in the whole town.

The sale of several works on the book-stalls at railway-stations. has been prohibited by the Minister of the Interior, Amongst these we notice "Les Ballons du Siege," by M. W. de Fonvielle, who, as it is known, escaped from Paris in a balloon during the investment of Paris, and delivered lectures in London. M. W. de Fonvielle, who was just returning from London when the prohibition was issued, has written to the minister in order to ascertain the real facts of that extraordinary decision.

Dr. A. Ernst prints (unfortunately in Spanish) under the title "La fécula y las plantas farináceas del nuevo mundo," a list of 100 plants of the New World which yield starch, with detailed accounts of the more important ones.

In the discussion which followed, Sir Bartle Frere's address, at the opening of the African Section of the Society of Arts, Mr. Hyde Clarke read a letter from Lieut. Maurice, Private Secretary to Sir Garnet Wolseley, dated "Head Quarters, Yancoomassie," from which we take the following extract; it may prove of some interest to students of the Science of language:—"A somewhat curious piece of word-coining, which has fallen under our notice here, may interest you in connection with the broader aspects of the subject of which you write. The Ashantees having experience of our rockets only as they come to them in destructive form at the end of their journey, call them by the sound they make, 'Schou-schou,' or something of the kind. The Fantees, on the other hand, adopt bodily into their Language our own names for those things which they have not seen before. Thus to the Houssa or the Fantee, in speaking to one another, our rockets are named rockets, while their enemies call them schou-schou. It is possible that as war has not been in savage times an uncommon condition of mankind, analogous causes for different names having been adopted by different nations may have been not unfrequent in the past."

The Council of the Statistical Society have founded a bronze medal, under the title of "The Howard Medal," to be presented to the author of the best essay on some subject in "Social Statistics," a preference being given to those topics which Howard himself investigated, and illustrated by his labours and writings. The title of the Essay to which the Medal will be awarded in November 1874, is as follows:—"The state of Prisons, and the condition and treatment of Prisoners, in the Prisons of England and Wales, during the last half of the eighteenth century, as set forth in Howard's "State of Prisons," and work on 'Lazarettos.'" The Essays must be sent to the Assistant Secretary of the Society on or before September 30. The competition is open to any competitor, providing the Essay be written in the English language.

We called attention last week to the course taken by the Perthshire Society of Natural Science, in reference to the present election of Members of Parliament. The Society sent questions to the candidates for the City and County of Perth, relating to the appointment of a responsible Minister of Education, to State help for Science, and to the promotion of scientific exploration expeditions, such as that of an Arctic expedition. The Liberal candidates sent no reply; the Conservative candidates sent favourable answers. The following is the reply of Sir William Stirling Maxwell, the Conservative candidate for the County of Perth:—

"In reply to your letter, I beg to say that I have long been of opinion that the Existing Education Department, and all our Public and Literary Institutions should be placed under the general supervision of a responsible Minister. In Parliament I was generally inclined to favour the expenditure of money for scientific objects when the Government thought proper to sanction them; and an Arctic expedition, and various researches, unremunerative in a pecuniary sense, might fairly fall into the list of such objects."

IN June last year Prof. O. C. Marsh, the discoverer of *Dinoceras and Brontotherium*, started on a five months' geological expedition to the Rocky Mountain regions and the Pacific coast, to study, as he had done on previous occasions, the Cretaceous and Tertiary formations, which are there so rich in vertebrate remains. From Fort McPherson, Nebraska, they proceeded to Niobrara under the escort of two companies of United States cavalry, which were indispensable on account of the hostile position of the Indian tribes. Among the other places visited were Fort Bridger, Wyoming; Idaho and Oregon; Colorado and Kansas. The expedition was very successful, and the collections procured were large, containing many new forms. It is much to be regretted that no English geologists have accompanied Prof. Marsh, as most of the fossils peculiar to the regions he is exploring, are quite unknown in this country, except from descriptions.

THERE will be held at Christ Church, Oxford, on Saturday February 28, an election to a Junior Studentship in Physical Science, tenable for five years from the day of election. It will be of the annual value either (1) of 100*l*. (inclusive of an allowance for room rent), if the Governing Body shall so determine; or (2) of 85*l*. (also inclusive of an allowance for room rent), which sum may be raised to the larger sum above-named after the completion of one year's residence, if the Governing Body shall so determine. Candidates must call on the Dean on Wednesday, February 18, at 1.30 P.M. The examination will follow at 2 P.M. Candidates must not have exceeded the age of 20 on the 1st of January last, and must produce certificates both of the day of their birth, and of good character. Papers will be set in Chemistry, Physics, and Biology; but candidates will not be expected to offer themselves for examination in all these subjects.

PROF. COPE has recently explored the beds of the late tertiary formation, called Pliocene, as it occurs in north-east Colorado. He discovered twenty-one species of vertebrata, mostly mammals, of which ten were new to science. Four are *carnivora*, six horses, four camels, two rhinoceroses, one a mastodon, &c. The most important anatomical results attained are that all the horses of the formation belong to the three-toed type, and that the camels possess a full series of upper incisor teeth. The discovery of a mastodon, of the *M. ohioticus* type, constitutes an important addition to the fauna. One of the horses is distinguished by its large head and slender legs, much longer than in the common horse. A full account of these results will shortly appear in the report of Dr. Hayden's Geological Survey of Colorado.

THE additions to the Zoological Society's Gardens during the past week include a Suricate (*Suricata zenic*) from S. Africa and a West African Python (*Python sebæ*), presented by Mr. J. H. Coonley; a Feline Douracouli (*Nyctipithecus felinus*) from Brazil, presented by Mr. G. Hollis; a common Kingfisher (*Alcedo ispida*), British, presented by Mr. A. Yates; a Collared Fruit Bat (*Cynonycterus collaris*), an Axis Deer (*Cervus axis*), and a Molucca Deer (*C. moluccensis*), born in the Gardens; two De Fillippi's Meadow Starlings (*Sturnella de filippi*) from Rio de la Plata, received in exchange.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, Jan. 22.—"On the Physiological Action of the poison of *Naia tripudians* and other Indian Venomous Snakes," II., by Drs. Brunton and Fayrer.

The results of these investigations show that the poison of the cobra is similar in its action to that of Ophiophagus, Bungarus, and other Colubrine snakes, whilst that of Daboia is similar to the virus of Echis, the Trimeresuri, and other viperine snakes, the chief difference between them being the greater tendency in the viperine poison to cause hœmorrhage or more severe local symptoms. The blood of animals killed by the viperine snakes generally remains fluid after death, whilst that of animals killed by colubrine snakes form a firm coagulum.

The conditions caused by the action of the poison are illustrated by the symptoms manifested by man and the lower animals. The Cobra, Ophiophagus Hydrophidæ, and Bungarus are all very deadly. The Viperine Daboia, and Echis are scarcely less so, whilst the Indian Crotalidæ, such as the Trimeresuri, are much less so. A series of experiments is detailed which illustrate the physiological action of the virus on the nervous system, the muscles, the blood, the respiration, the circulation, and the function of excretion, and also the mode in which death is produced.

The fatal action is shown to be due (1) to arrest of the respiration by paralysis of the muscular apparatus, by which that function is carried on. (2) Or by rapid arrest of the heart's action, in cases where the poison has found direct entry by a vein, *e.g.* the jugular. In such, death is almost instantaneous, and the heart is found to have ceased to beat when in systole. The physiological import of this is very interesting and important, and it was demonstrated by Dr. Brunton, who explained its probable mode of action in certain ganglionic centres in the heart; a subject which gave rise to some discussion; (3) or death may be due to a combination of arrest of respiration and of the heart's action; (4) or it may be due where the quantity of poison is small, or its quality less active, to secondary causes of the nature of other septicæmia, a purely pathological question not discussed.

The mode in which paralysis of respiration (the ordinary form of death) is induced, has been most thoroughly investigated, and it may be said that the question is now settled.

The virus absorbed into the blood either by inoculation into the areolar tissue, or by application to a mucous membrane, affects the cerebro-spinal nerve-centres, the nerves and their peripheral distribution, more especially of the motor nerves. The sensory nerves are less and later affected, and the intelligence generally latest of all, and slightly. The complete loss of it, and the convulsions which precede death, is mainly caused by the circulation of venous blood, the result of the impeded respiration.

Muscular force and co-ordination are gradually lost; paralysis and asphyxia being the evidence thereof. In ordinary cases, the heart goes on beating vigorously long after apparent death, and with artificial respiration, may be kept up for many hours.

The investigations recorded, were made with cobra and daboia poison, sent to England from Bengal in the dried state, a condition in which it resembles gum arabic, and its activity is great. The animals experimented on were dogs, cats, rabbits, guinea-pigs, fowls, pigeons, small birds, frogs. Its action on all these, and the mode in which functions and tissues are affected, are recorded in detail, as well as the extent to which the action of the poison is modified when introduced through different channels.

It has now been clearly shown that the poison acts, when introduced into the stomach, or when applied to a mucous or serous membrane. The idea that it was only effective when injected directly into the blood, is erroneous. It is, no doubt, more certainly and rapidly fatal when it enters the blood direct.

It is also shown that it may be eliminated by the excreting organs, and that there is, therefore, reason to hope that life may be saved if it can be artificially sustained long enough to admit of complete elimination being accomplished, as in the case of curare poisoning; but from the more complex action of the cobra poison this remains a subject of doubt.

By artificial respiration the circulation has been maintained, both here and in India, by Dr. Ewart and Mr. Richards, for many hours; and in one case, after complete paralysis had occurred, symptoms of reaction and elimination were obtained; but no